

A COUNTRY SELECTION METHOD FOR GLOBAL SOURCING

Prof. Dr. Thomas Cleff, Hochschule Prorzhheim

Abstract

This article proposes a method for reducing the complexity of decisions in the international procurement process. This procedure is part of the “Global Sourcing Management-Tool”, developed by the author in co-operation with the German mechanical engineering company Heidelberger Druckmaschinen AG and the Centre for European Economic Research Mannheim (ZEW). Based on foreign trade data, the method uses indicators, which allows a cross-section and longitudinal-section valuation of the average international competitiveness and the average supplied product quality of all possible supplier countries. The method thus provides a variety of information for procurement departments, including the present level and the dynamic of competitiveness and product quality for the potential supplier countries within every product group of the international product nomenclature (Combined System and the Harmonised System). Potential supplier countries - the companies of which have proven to be particularly competitive in the different product quality stages - are identified. This pre-selection of countries enables the companies to limit their search for potential suppliers to the selected supplier countries. High “search costs” are subsequently reduced and, in addition to that, trend prognoses can be constructed. Potential supplier countries which have not yet reached a certain quality standard or a certain competitiveness, but have caught up strongly during recent years, can be observed sensitively.

JEL classification: M 21, M 11, D 81, F 23, L 15, F 47

Acknowledgement

I would like to thank Marian Beise, Günther Ebling, Norbert Janz, and Wolfram Fendler for their stimulating comments. This project was supported by the *Heidelberger Druckmaschinen AG*.

Non-technical Summary

The globalisation of commerce and industry pressures more and more companies into carrying out an internationalisation of their procurement activities. But how can the most competitive suppliers in international procurement markets be identified? The selection of suppliers arise in particular for those companies which are at the beginning of an internationalisation of their procurement activities and therefore have very little international experience. Such companies face a variety of options which they often cannot counter with their traditional knowledge and pro-

curement process. Even internationally-experienced companies are forced into constantly checking the competitiveness and product quality of their international suppliers in order to develop their own product and cost leadership. In practice, no methods exist for evaluating the competitiveness of supplier countries. First of all, the factors which must be taken into account are regarded as being too complex. Such methods seem to be inferior with regard to their general comprehensibility of an “intuitive and entrepreneurial” approach, leading to the fact that a systematic application of such methods has not been pushed ahead. This article proposes a method for reducing the complexity of decisions in the international procurement process. This procedure is part of the “Global Sourcing Management-Tool”, developed by the author in co-operation with the German mechanical engineering company Heidelberger Druckmaschinen AG and the Centre for European Economic Research Mannheim (ZEW). Based on foreign trade data, the method uses indicators, which allows a cross-section and longitudinal-section valuation of the average international competitiveness and the average supplied product quality of all possible supplier countries. The method thus provides a variety of information for procurement departments, including the present level and the dynamic of competitiveness and product quality for the potential supplier countries within every product group of the international product nomenclature (Combined System and the Harmonised System). Potential supplier countries - the companies of which have proven themselves to be particularly competitive in the different product quality stages - are identified. This pre-selection of countries enables the companies to limit their search for potential suppliers to the selected supplier countries. High “search costs” are subsequently reduced and, in addition to that, trend prognoses can be constructed. Potential supplier countries which have not yet reached a certain quality standard or a certain competitiveness, but have caught up strongly during recent years, can be observed sensitively.

Introduction

The internationalisation of the economy has prompted companies to spatially expand their procurement activities. As a result the number of potential suppliers and the complexity of optimising the procurement in view of the cost and quality advantages grows (Hesselberger, 1997, p. 51). Global sourcing does not solely aim at providing material requirements but also at integrating international suppliers into the quality management process itself. In this manner, technological developments being designed abroad can be integrated much faster into own process and product development. Global sourcing is therefore not only an instrument of procurement policies but also an instrument of corporate strategy (Rosenwald, 1998, p. 384, Anders, 1992, p. 82)

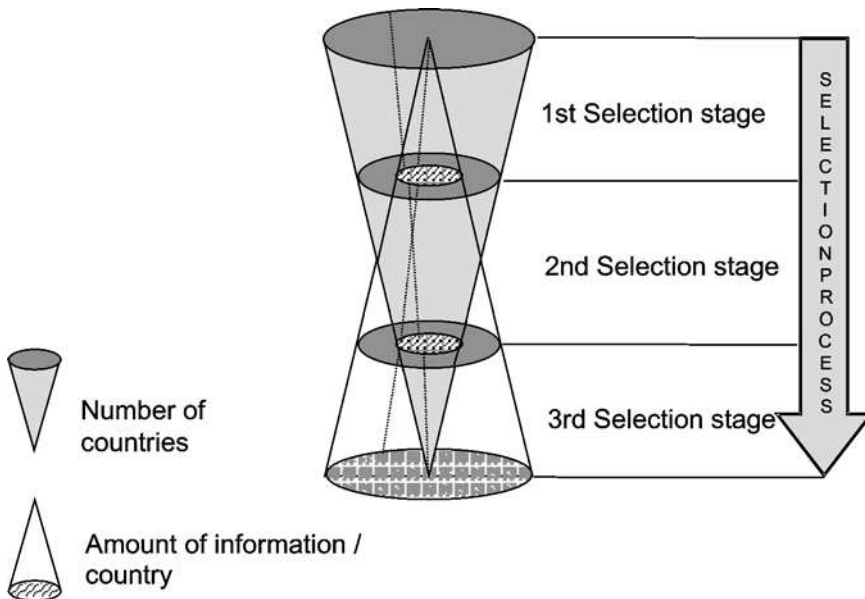
How can the most competitive suppliers in international procurement markets be identified? This question arises in particular for those companies which are at the beginning of an internationalisation of their procurement activities and therefore

have very little international experience. Such companies face a variety of options which they often cannot counter with their traditional knowledge and procurement processes. Even internationally experienced companies are forced into constantly checking the competitiveness and product quality of their suppliers in order to develop their own product and cost leadership.

In practice, no methods exist for evaluating the competitiveness of supplier countries. First of all, the factors which must be taken into account are regarded as being too complex. Such methods seem to be inferior with regard to their general comprehensibility of an “intuitive and entrepreneurial” approach, leading to the fact that a systematic application of such methods has not been pushed ahead.

The demand for a systematic procedure calls for an analysis set at a highly-aggregated (macro-economic) level where, initially, all the countries of the world can be taken into consideration (Koppelman, 1998, p. 73). With the help of selection criteria, the individual supplying countries - and with that their companies - are filtered step by step. This means that from a certain depth of analysis onwards, national frame data (country criteria) no longer suffice for making a valid selection of supplier countries. At this point one must leave aside that level of analysis in order to be able to integrate into the decision process information on individual companies.

Figure 1: Changes in Information Density during the Course of the International Procurement Process



Source: ZEW (1998): Global Sourcing Management-Tool

The formulation of selection criteria inevitably leads to factors sufficiently discussed in literature which influence the decision for supplier companies (Levy, 1993, p. 21, Piontek 1994, Piontek, 1997):

1. Suppliers are supposed to improve the innovation capacity of the company being supplied. This occurs through the adoption of new technologies by the supplier and the diffusion of these technologies within the buyer's product. The extensive form of this technology transfer consists of the concerted development of new technologies in the form of joint ventures etc.

2. The products supplied should be related to one another in an optimal ratio of price and quality.

3. The deciding criteria also includes the question of whether the supplier is capable of supplying the necessary quality in an adequate number of units over a longer period of time. In the process, the crucial influence not only involves corresponding production capacities but also the economic and political stability in the country where the production site is located.

If a purchaser is familiar to some suppliers, evaluation criteria can be formulated with the help of traditional business management instruments of the supplier analysis (Koppelman, 1998, p. 80). A systematic approach, however, presumes a corresponding selection on a higher aggregated level (national). In this case, large gaps appear in empirical literature which must be filled at this point.

Indicators for the evaluation of "country risks" are possibilities for first selection criteria for potential supplier countries. (Rosenwald, 1998, p. 45) A considerable amount of indicators (for example, Beri-Index, Institutional Investor Rating, etc.) make efforts to record these risks. The question as to which one of the many risk indicators offered commercially may be adequate for a company, depends on the company activity being evaluated. The simplest form of internationalisation, namely export business and international sourcing, simply requires an evaluation of the business climate and political risk, whereas with direct investments, the risk of a failing transfer of gain must also be evaluated. Despite the differing goals of the commercial risk indicators, one can detect remarkably high correlations among the different indices of over 0.9¹, meaning that a risk evaluation of potential supplier countries can easily be limited to one risk index. Exactly which value of (political and economic) instability may be considered as tolerable, depends on the respective company strategy chosen (Corsten, 1992, p. 681, Kreikebaum, 1997, p. 21) and can only be integrated into the statistical selection method insofar as countries with excessive risk classes are excluded from the analysis.

¹ The Institutional Investor Country Credit Rating (IIR) of March 1998 and the index developed by the insurance company HERMES, for example, correlate with a coefficient of 0.93. In 1996, the BERI-Index and the IIR of March 1996 correlated with 0.92. Even the individual sub-indices of the BERI-Index (ORI, PRI and r96) correlate with the IIR to the same great extent.

In general, this limitation scarcely leads to a significant reduction of potential supplier countries, particularly since the sorting-out affects countries with lower industrial production almost exclusively. Based on foreign trade data, the following method² uses indicators, which allows a cross-section and longitudinal-section valuation of the average international competitiveness and the average supplied product quality of all possible supplier countries to be made. The method thus provides a variety of information for procurement departments, including the present level and the dynamic of competitiveness and product quality for the potential supplier countries within every product group of the international product nomenclature (Combined System and the Harmonised System). Potential supplier countries - the companies of which have proven to be particularly competitive in the different product quality stages - are identified (see section). The model was validated for internationally-known procurement and sales markets of the German mechanical engineering company Heidelberger Druckmaschinen AG. The method has been evaluated by officials with a sound global overview with regard to the quality and competitiveness of selected intermediate products (see section)

This pre-selection of countries enables the company to limit the search for potential suppliers to the selected supplier countries. Search costs are consequently reduced. Trend prognoses can be constructed. Potential supplier countries which have not yet reached a certain quality standard or a certain competitiveness, but have caught up strongly during recent years, can be observed sensitively. At the same time, the opposite (negative) trend can be used as an early warning system.

Quality Standards and Competitiveness of Supplier Countries

The Portfolio of Quality

When trading with goods in the same product class of the international product nomenclature, price differences can be led back to differences in quality. Accordingly, the ratio of the value and the quantity of the goods traded is a measure of quality (known as the “unit value” (UV)). A high unit value indicates higher quality, a lower unit value a lower one (Aw/Roberts, 1988, p. 271). The question of interest not only consists of the level at which the unit value of a country stood in the previous survey year and in how far this level deviated from the average value of all countries, but also the question regarding the type of development the unit value of a country has endured over the entire period when compared to the average development of all countries. For this reason the unit values of the individual years are calculated from international trade databases (see chapter) and

² This procedure is part of the “Global Sourcing Management-Tool”, developed by the author in co-operation with the Heidelberger Druckmaschinen AG and the Centre for European Economic Research Mannheim (ZEW). The individual stages of selection for the procurement process are delineated in the appendix.

put into a linear context by using simple OLS regressions. The estimator of the variable UV_{tik} corresponds to the Unit Value for supplier country i ($i = 1, \dots, j, \dots, m$) trading with country k . The variable $year_inv$ results from subtracting the value for the final year of the observation period ($\max(t)$) from the value for the respective year of observation (t). A value of zero thus comes about for the observations of the previous survey year, a value of -1 for the survey year preceding the last year of survey etc. The variable ε_{tik} represents the error term and g the constant of the regression. The regression reg_j is estimated separately for every supplier country ($i = 1, \dots, j, \dots, m$). Nevertheless, each regression reg_j includes the data of all countries ($i = 1, \dots, j, \dots, m$).

$$reg_j : UV_{tik}^j = \gamma^j + \alpha^j * supp_{tik}^j + \beta^j * supp_trd_{tik}^j + \delta^j * year_inv_t^j + \varepsilon_{tik}^j$$

$$supp_{tik}^j = \begin{cases} 1, & \text{if } i = j \\ 0, & \text{otherwise} \end{cases}$$

$$year_inv_t^j = (\text{year} - \text{final year of the observation period})$$

$$supp_trd_{tik}^j = year_inv_t^j * supp_{tik}^j \quad : \text{ all supplier countries}$$

$$i = 1, \dots, j, \dots, m \quad : \text{ supplier country under consideration}$$

$$j \quad : \text{ trading partner of country } i \text{ providing trade statistics}$$

$$k = 1, \dots, K; \quad k \neq i$$

$$t \quad : \text{ time index (year)}$$

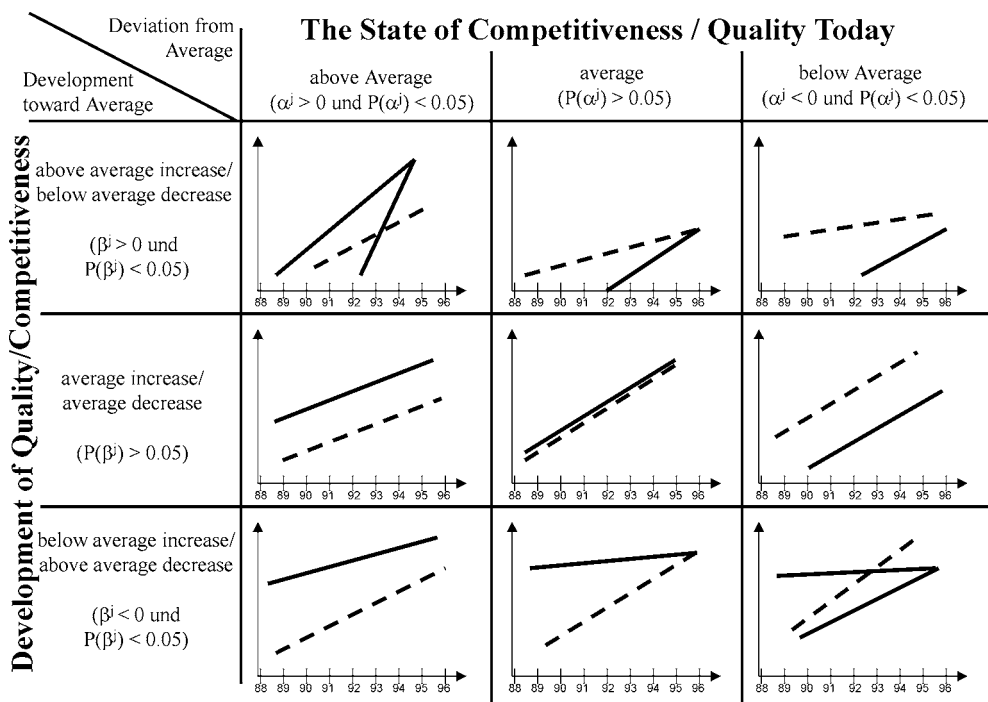
$$\text{The maximum number of observations in } reg_j = ((1 - \max(year_inv_t^j)) * i * k)$$

From the results obtained, a predicted unit value can be ascertained for the previous survey year ($\max(t)$) over all supplier countries. It corresponds to the constants (g) of the regression. Exactly how far the individual countries j ($j = 1, \dots, k, \dots, m$) deviate from the annual average unit value in the final survey year, is able to be identified from the respective coefficient a_j .³ The estimated annual average product quality of a country j for the final survey year lies above the corresponding total annual average of all countries, if the corresponding coefficient a_j demonstrates a positive coefficient with a level of significance commonly applied among statisticians of less than five percent ($P(a_j) < 0.05$). Accordingly, the estimated annual average product quality of a country j for the final survey year lies below the corresponding total annual average if the coefficient a_j is negative with a level of significance of less than five percent ($P(a_j) < 0.05$). In all other cases, the estimated annual average product quality of a country lies within the total annual average of all countries for the previous survey year.

³ The estimated unit value of a particular country for the last survey year is obtained by adding the constant with the respective coefficient a_j for the appropriate country accordingly.

The development which the estimated product quality takes over all time periods can be read within the regression from looking at the coefficient δ_j . If δ_j is significantly positive, then the unit value generally increases. In the opposite case, where δ_j is significantly negative, the corresponding unit value decreases over the course of time. With the help of coefficient β_j the development trends of the individual country j can be put into comparison with the annual average development trend of all countries. The estimated trend of the unit value of a country respectively increases more or decreases less over time if the corresponding coefficient β_j takes on a positive value and the level of significance turns out to be smaller than five percent ($P(\beta_j) < 0.05$). The estimated trend of the unit value of a country j , on the other hand, increases less or decreases more respectively over time if β_j assumes a negative value and the level of significance is smaller than five percent ($P(\beta_j) < 0.05$). In all other cases the time trend of the unit value of a country j develops within the annual average of all countries. Possible constellations between the state and the development of product quality supplied by a country are depicted in the form of a “portfolio”. The annual average development of all countries is represented by a dotted line and, in an exemplary fashion, the development of an individual country by a solid line.

Figure 2: Regression Results and Development of the Unit Value / Competitiveness



Source: ZEW (1998): Global Sourcing Management-Tool

The Portfolio of Competitiveness

The supplied product quality is only a first criteria for the selection of a supplier country: the annual average international competitiveness within a product group of the international product nomenclature provides us with another. The more one country succeeds in working out an export surplus within a group of homogeneous products in bilateral trade, the higher the estimated competitiveness will be (see Grubel/Lloyd, 1975). To ascertain competitive advantages between two countries, the ratio of export surpluses to total trade volume (CA_{tik}) within a product group p should therefore be applied:

$$CA_{tik} = \frac{x_{tik} - m_{tik}}{(x_{tik} + m_{tik})}$$

- x_{tik} : Export of a specific Product from country i to country k
 m_{tik} : Import of a specific Product to country i from country k
 $i = 1, \dots, j, \dots, m$: All supplier countries
 $k = 1, \dots, K; k \neq i$: Trading partner of country i providing trade statistics
 t : Time index (year)

The chosen definition of “absolute competitive advantage” corresponds to the objectives set out by a company when identifying potential supplier countries. The “Revealed Comparative Advantage (RCA)” (Balassa, 1965) applied in the tradition of economics for determining comparative advantages, is considered to be a non-appropriate indicator: if we assume that the RCA is defined as follows (see Wolter, F., 1977):,

$$RCA_{tik} = \frac{x_{tik}}{m_{tik}} : \frac{X_{tik}}{M_{tik}} \quad \text{with}$$

- x_{tik} : Export of a specific Product p from country i to country/region k
 m_{tik} : Import of a specific Product p to country i from country/region k
 X_{tik} : Total Export from country i to country/region k
 M_{tik} : Total Imports to country i from country/region k
 $i = 1, \dots, j, \dots, m$: All supplier countries
 $k = 1, \dots, K; k \neq i$: Trading partner of country i providing trade statistics
 t : Time index (year)

then a positive absolute competitive advantage can lie relatively hidden behind a low RCA of a country if the ratio of exports to imports of a particular product group is indeed higher than 1, but the corresponding ratio in total trade turns out to be cor-

respondingly higher. In extreme cases in particular, this can lead to the misjudging of a nation which is strong in exports with respect to the absolute competitiveness of potential supplier countries (Porter, 1986, p. 9, Mucchielli, 1987, p. 4, Breuss, 1997, p. 84).

Analogous to the analysis of establishing portfolios of quality, a portfolio of competitiveness with the different constellations between the state and the development of the competitiveness of a country may be constructed. The estimator of the variable CA_{tik} corresponds to the degree of competitiveness of country i . The regression reg^j is estimated separately for every supplier country ($i = 1, \dots, j, \dots, m$). Once again, each regression reg^j includes the data of all countries ($i = 1, \dots, j, \dots, m$).

$$reg^j : CA_{tik}^j = \gamma^j + \alpha^j * supp_{tik}^j + \beta^j * supp_trd_{tik}^j + \delta^j * year_inv_t^j + \varepsilon_{tik}^j$$

$$supp_{tik}^j = \begin{cases} 1, & \text{if } i = j \\ 0, & \text{otherwise} \end{cases}$$

$$year_inv_t^j = (\text{year} - \text{final year of the observation period})$$

$$supp_trd_{tik}^j = year_inv_t^j * supp_{tik}^j$$

$$i = 1, \dots, j, \dots, m \quad : \text{all supplier countries}$$

$$j \quad : \text{supplier country under consideration}$$

$$k = 1, \dots, K; \quad k \neq i \quad : \text{trading partner of country } i \text{ providing trade statistics}$$

$$t \quad : \text{time index (year)}$$

$$\text{The maximum number of observations in } reg^j = ((1 - \max(year_inv_t^j)) * i * k)$$

Analogous to the portfolio of quality, the interpretation of the competition portfolio of competitiveness in thus arises. The estimations of indicators for product quality and competitiveness can be observed simultaneously, so that an evaluation of the individual supplier countries with regard to their competitiveness is made possible within the various stages of quality. An example for such a portfolio will be shown in the next chapter.

Practical Application and Validation of the Method

Foreign Trade Statistics and the Product List of an Industrial Company

For conducting the prior analyses, the EUROSTAT and OECD foreign trade databases can be used.

Variables	Database	
	OECD	EUROSTAT
Period	1988-1996/97	1988-1998
Supplier Countries	All	All
Purchasing Countries	OECD, China, Hong Kong, Taiwan	EU
Product Classification	6-digit Harmonised System	8-digit Combined Nomenclature

Foreign Trade Data are available from the OECD on the basis of the 6-digit “harmonised system”. The data set encompasses the reports of all OECD-countries, China, Taiwan, Hong Kong, for the years 1988-1997. The “harmonised system” consists of the three hierarchically-ordered levels of product differentiation HS2, HS4 and HS6.⁴ The European foreign trade statistics offer data on an 8-digit-aggregational (combined nomenclatures) level⁵. These data are available for the years 1988 to 1998 and in contrast to the data of the OECD, only encompass the trade of individual EU states. Therefore trade flows outside of the EU, such as those between Japan and the USA for example, are not determined. Both data sources therefore demonstrate differences in their differentiation according to products and the degree of bilateral trade flows ascertained between states from varying regions. The use of both data sources should hence be conducted adequately to the problem: the European foreign trade statistics should be given priority in the case of identifying countries with competitive supplies of certain products in the EU. As a result of this, the capacity to differentiate between products traded is maximal. The statistics from the OECD, on the other hand, should be used when countries with a competitive supply of certain products are to be identified in the entire world. The capacity to differentiate between individual products is lower in this process than in the European “combined nomenclature”.

Essentially, the choice also depends on the degree of product key differentiation of a company whose procurement department wants to utilise the foreign trade statistics for ascertaining national competitive advantages. Within the context of a project, products from the product list of the Heidelberger Druckmaschinen AG

⁴ With the transition to the HS-System in 1988, a new revision of the SITC (Standard International Trade Classification) was undertaken. This version (Rev. 3) takes on the structure of the HS, so that the smallest structural units of the SITC are defined by the lower positions of the HS. Consequently, the HS-taxonomy turns out to be more differentiated than the traditional 5-digit- SITC-Code (Rev. 3).

⁵ These are based on the 6-digit- “harmonised nomenclature”, which was extended by 2 digits on the European level (combined nomenclature). Thus the first three levels of the harmonised nomenclature HS2, HS4 and HS6 correspond to the combined nomenclature, completed by a further level KN8.

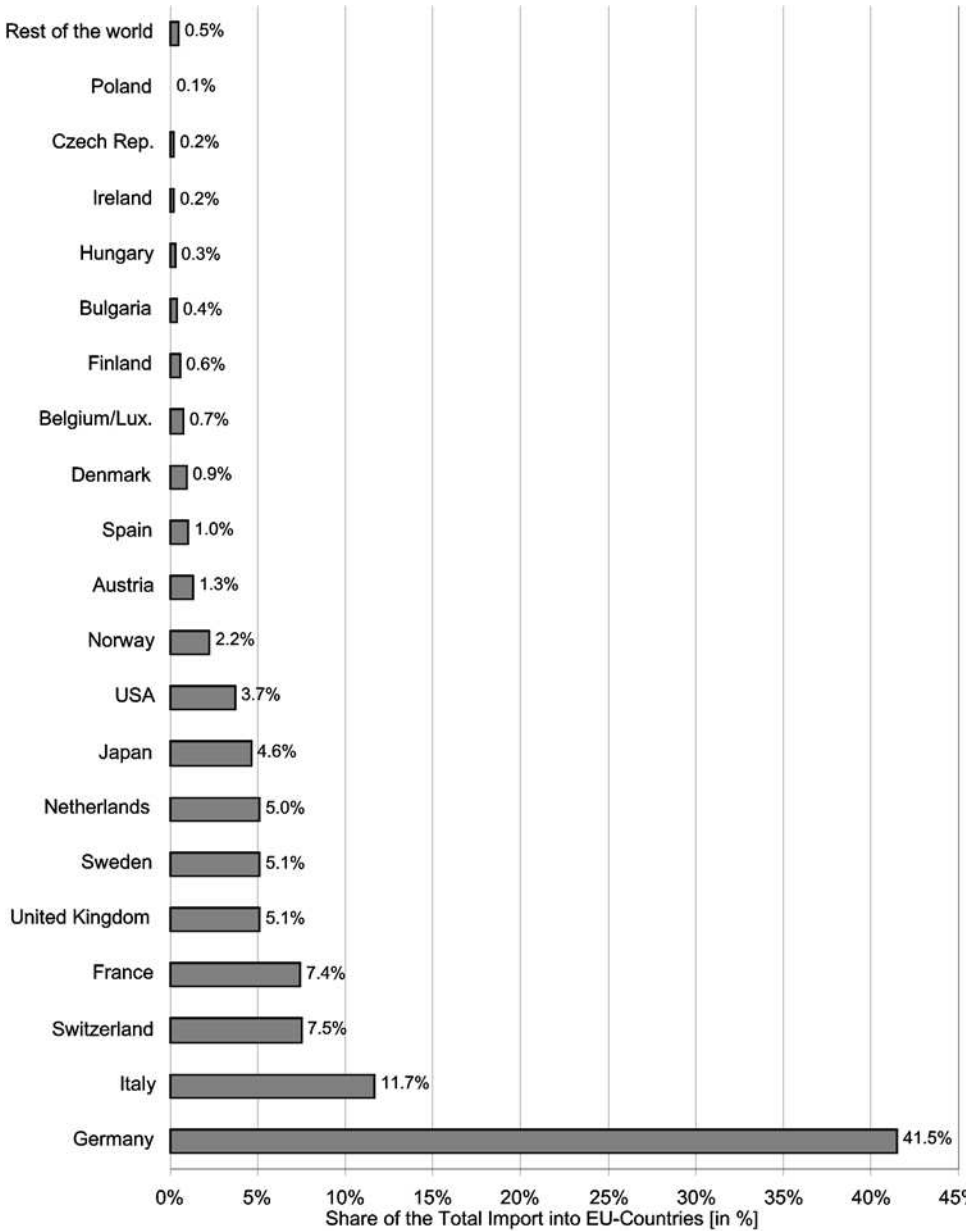
were assigned the 8-digit-“combined nomenclature”. For 43 percent of the products, a direct allocation to the nomenclature of the EU-foreign trade statistics occurs without any problems. For a further 21 percent, allocations can approximately be made with products aggregated at a higher level. Although 36 percent of the products cannot be recorded with the help of the foreign trade statistics, these products partly involve activities performed by other firms, such as contract processing, which per definition cannot be included in the combined nomenclature, being built on physical products. The method is not applicable to non-physical products. In summary, one may presume a very satisfactory allocation of the 8-digit-nomenclature to an industrially widespread product list.

An Example: Linear-Acting Pneumatic Power Engines and Motors

Using the example of “linear-acting pneumatic power engines and motors (CN: 84123190)”, the method introduced in section will be delineated with the help of the European foreign trade statistics. The shares of individual supplier countries are depicted in the following graphic. Germany and Italy have the highest trade share with a total of 53 percent, whereas Japan only achieves a share of 4.6 percent. Buyers with high practical experience identify Japan as the nation with the most competitive supplier for linear-acting pneumatic power engines and motors. The simple observation of shares from European trade consequently indicates the first beginnings for identifying competitive nations; as a valid indicator for the support of strategic company decisions, however, this remains too imprecise. The same is true for the specialisation measure of the RCA already mentioned above and commonly applied amongst economists. Indeed, the specialisation measure for Switzerland or Germany takes on a value greater than one, yet other nations which are regarded as competitive by professional buyers and are partly strong in exports, such as Japan, achieve only low specialisation measures (see).

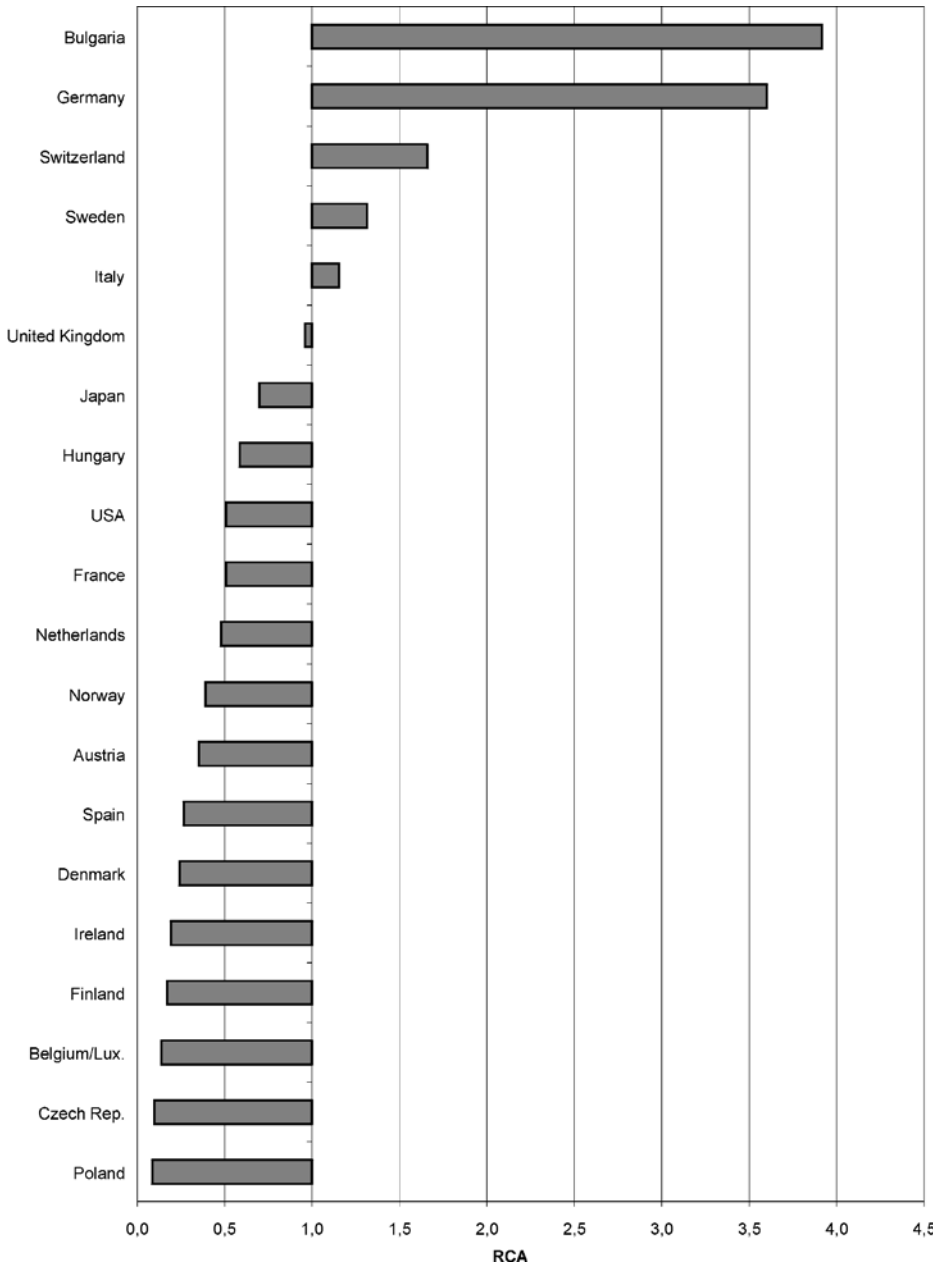
If one employs the method put forward in section for the cross-section of competitiveness and product quality, one arrives at the systematisation of countries seen in. This systematisation corresponds to the estimations of quality standards and competitiveness made by the professional buyers. However, the extent to which this method actually delivers valid results, was reviewed according to a broad spectrum of products.

Figure 3: Share of Total Imports of Linear-Acting Pneumatic Power Engines and Motors into the EU [Base-Unit: 1 000 ECU]

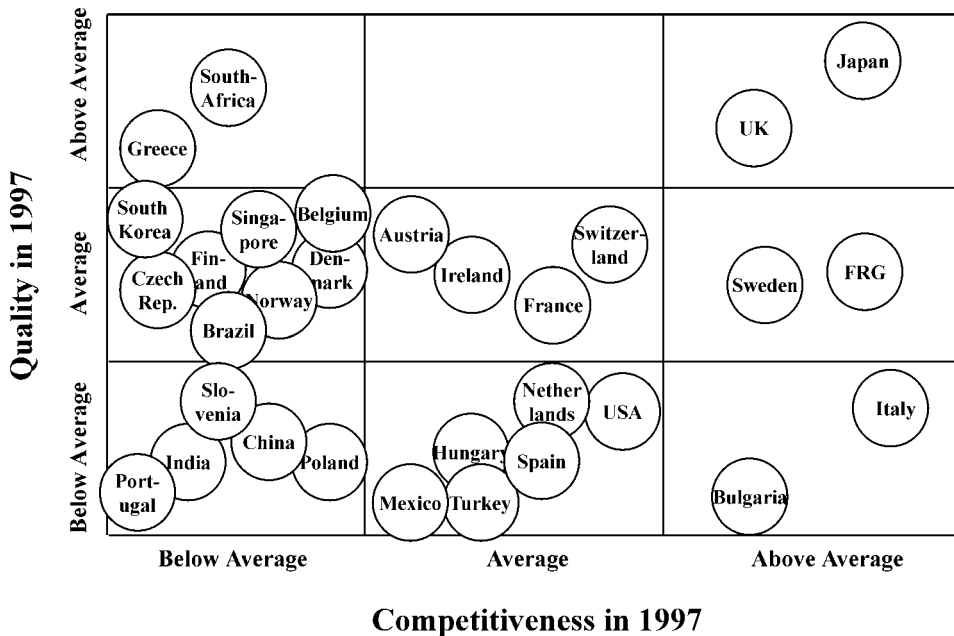


Source: Author's own calculations based on the EUROSTAT COMEXT database.

Figure 4: The RCA of different countries for Linear-Acting Pneumatic Power Engines and Motors [Base-Unit: 1 000 ECU] Source: Author’s own calculations based on the EUROSTAT COMEXT database



Source: Author’s own calculations based on the EUROSTAT COMEXT database.

Figure 5: The Portfolio of Quality and Competitiveness

Source: ZEW (1998): Global Sourcing Management-Tool

Validating the Method

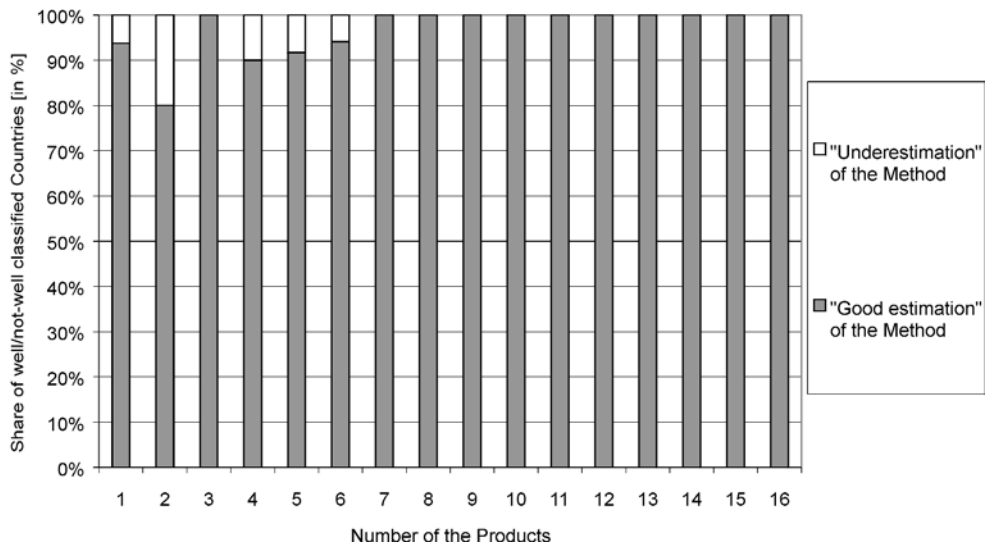
Validating the empirical-statistical procedure of analysis requires detailed market knowledge concerning the respective products under investigation. Users of the analysis procedure are generally less familiar with the international market on the buying-side, meaning that the validation model proves itself only some time after application. On the selling-side, market familiarity is more often pronounced, so that should the occasion arise, the procedures can be reviewed on this side of the added value chain.

The model was validated for internationally-known procurement and sales markets of the *Heidelberger Druckmaschinen AG*. The following illustrations delineate the deviations - structured according to product groups - between the market knowledge (approximation) of the *Heidelberger Druckmaschinen AG* and the empirical-statistical results. It becomes quite visible that hardly any deviations occur between market familiarity and statistical analysis when evaluating the competitiveness of the supplier countries. A total of 11 out of 16 products indicate no deviations, with a further 4 out of the 16 resulting in just one deviation. As far as the last one is concerned, the *Heidelberger Druckmaschinen AG* approximation of the

deviated supplier country turns out to be higher than that of the statistical analysis, which can partly be explained by the traditional procurement structures of the company: evaluators try to make their own actions plausible by orienting their evaluations (whether consciously or unconsciously) according to traditional structures. The approximation of competitiveness orients itself according to current procurement structures, which at the *Heidelberger Druckmaschinen AG* are primarily focussed at the German market.

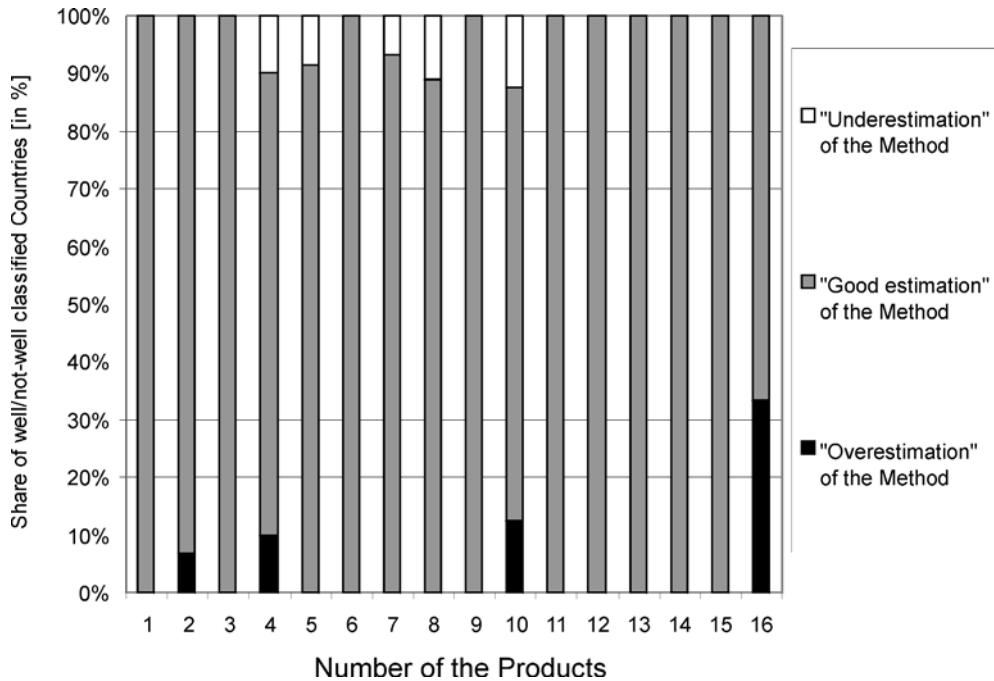
The influence of traditional procurement structures is especially strong when estimating product quality standards. Indeed, in more than half of the product groups (56 Percent), the quality standards are identified identically. For 19 percent of the product groups, the quality standard approximated by the *Heidelberger Druckmaschinen AG* and the one ascertained by the statistical analysis differ only for the supplier country Germany. The buyers of the *Heidelberger Druckmaschinen AG* systematically assume the quality standard of German products to be higher. For a further 13 percent of the products, next to a higher approximation of German product quality, standard quality of a further country is identified in a different way. If, under certain circumstances, one refrains from considering traditional procurement structures attributed to the “Germany-Bias”, for 12 out of 16 products equal allocations arise when estimating according to the buyers of the *Heidelberger Druckmaschinen AG* and the statistical analysis.

Figure 6: Evaluation of the Country Competitiveness for 16 Products: Comparison of Results between the Method Applied and Estimations made by the *Heidelberger Druckmaschinen AG*



Source: ZEW (1998): Global Sourcing Management-Tool

Figure 7: Evaluation of the Country-Quality-Standards for 16 Products: Comparison of Results between the Method Applied and Estimations made by the *Heidelberger Druckmaschinen AG*



Source: ZEW (1998): Global Sourcing Management-Tool

Summary

The large German share in foreign trade now already earmarks the far-reaching integration of German companies within the world economy. Companies meet the globalisation of markets by internationalising their own activities and aligning company strategies according to international competition. The German home market no longer makes up the decisive benchmark of strategic considerations, meaning that even procurement strategies – and here especially the regional configuration of the suppliers – are increasingly being put on the test stand.

The multitude of options which may exist within the context of a global procurement strategy can only be optimally utilised when the conception of various strategies is supported by the processing and provision of information as well as the construction of decision models.

Decision models known from literature, which are based solely on information about the individual suppliers at company-level, are only feasible when a manageable number of potential suppliers exists world-wide. This, however, should be more of an exception than a rule. In the regular scenario, the reduction has to comprise reducing the complexity of national frame data. In co-operation with the mechanical engineering company *Heidelberger Druckmaschinen AG*, an attempt was therefore made to develop and validate a method for pre-selecting possible supplier countries. In the process, it was possible to close the gap between economic data and company information and to systematically reduce the multitude of options to a manageable quantity.

The method was successfully validated with the help of the market knowledge of the *Heidelberger Druckmaschinen AG*. Divergences between the statistical result and the estimation of the experts from the *Heidelberger Druckmaschinen AG* appear almost exclusively when evaluating the qualification standards within German production. This "Germany-Bias" probably explains itself in particular, from the *Heidelberger Druckmaschinen AG* supplier structure focussing on Germany. Consequently, with regard to internationalising procurement activities, this method acts as a spotter for the company.

Despite the high validity of the instrument, attention must be drawn at this point to the shortcomings of such an approach. With respect to free trade, defining competitiveness over commercial advantages would very much turn out to be fruitful. Trade barriers to tariffs and non-tariffs tend to skew results in the manner of country competitiveness apparently rising with the height of the trade barriers. (Breuss, 1997, p. 86) The results of this method should therefore only be interpreted when one is aware of the corresponding trade restrictions.

References

- Anders, W. (1992), *Strategische Einkaufsplanung: Kernbereich eines strategischen Einkaufsmanagements*, Frankfurt a. M. et al.
- Aw, B. Y., Roberts, M. J. (1988), Price and Quality Level Comparisons for US Footware Imports: An Application of Multilateral Index Numbers, in: Feenstra, R. C. (ed.), *Empirical Methods for International Trade*, London, pp. 257-275.
- Balassa, B. (1965), Trade Liberalisation and "Revealed" Comparative Advantage, in: Williams B. R. (ed), *The Manchester School of Economic and Social Studies*, Vol. XXXIII, pp. 99-123.
- Breuss, F. (1997), *Außenwirtschaft Band 1*, Wien.
- Corsten, H. (1992), *Lexikon der Betriebswirtschaftslehre*, München.
- Feenstra, R. C. (ed.) (1988), *Empirical Methods for International Trade*, London.

- Grubel, H. G., Lloyd, P. J. (1975), *Intra-Industry Trade*, London.
- Hesselberger, M. (1997), *Innovative Logistik: Versorgungsstrategien, Standortkonzepte, Steuerungselemente*, Wiesbaden.
- Koppelmann, U. (1998), *Procurement Marketing, A Strategic Concept*, Berlin et al.
- Kreikebaum, H. (1997), *Strategische Unternehmensplanung*, Edition 6, Stuttgart.
- Levy, D. (1993), *International Production and Sourcing: Trends and Issues*, in: OECD (ed.): STI Review No. 13, pp. 13-59, Paris.
- Mucchielli, J.-L. (1987), *Principes d'Economie Internationale*, Paris.
- Piontek, J. (1994), *Internationale Logistik*, Stuttgart.
- Piontek, J. (1997), *Global Sourcing*, München.
- Porter, M. E. (1986), *Changing Patterns of International Competition*, California Management Review, Vol. XXVIII, Number 2, pp. 9-40.
- Rosenwald, W. (1998), *Global Sourcing im Einkauf*, in: Strub, M. (ed.): *Das große Handbuch Einkaufs- und Beschaffungsmanagement*, Landsberg/Lech.
- Wolter, F. (1977), *Factor Proportions, Technology and West German Industry's International Trade Patterns*, *Weltwirtschaftliches Archiv* 113, pp. 250-263.
- ZEW (1998), *Global Sourcing Management-Tool, Methodischer Erklärungsband zur Software*.